# 1 Cube Charge

(a) Charge is distributed throughout the volume of a dielectric cube with charge density $\rho = \beta z^2$, where $z$ is the height from the bottom of the cube, and where each side of the cube has length $L$. What is the total charge inside the cube? Do this problem in two ways as both a single integral and as a triple integral.

(b) On a different cube: Charge is distributed on the surface of a cube with charge density $\sigma = \alpha z$ where $z$ is the height from the bottom of the cube, and where each side of the cube has length $L$. What is the total charge on the cube? Don't forget about the top and bottom of the cube.